

Reynolds (D.)

DISEASES OF THE CONJUNCTIVA.

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DISEASES OF THE CONJUNCTIVA.

Volumes have been written on the diseases of the conjunctiva, and, strange though it may seem to many, the subject is far from being exhausted. As I will be able to mention but a very small number of those diseases, I have thought it most appropriate to devote my present report to the consideration of the affections which have been known to prevail endemically, and which furnish inoculable matter in the discharges from the inflamed surfaces.

In order to elucidate that portion of the subject to which my labors are to be confined in this report segregation becomes a sort of necessity; and this necessity pleads for your indulgence while I may be permitted to examine some of the anatomical features of the conjunctiva. Important morphological conditions of the membrane have suggested to anatomists the necessity of recognizing four different portions, which, fortunately for the therapist, are in different situations. The first division is called the *palpebral* portion, which is limited to the posterior surfaces of the tarsi. The palpebral conjunctiva is tense, firmly tied down to the tarsi by a short connective tissue void of fat. The only glands found here are the gland-cells lining the mucous follicles, and the lymph-corpuscles, found in the inner half of the membrane only. The lymphatics of this portion, if indeed they exist here at all, are so very rudimentary that Krause is the only histologist, so far as I know, who claims to have seen them. Metz says "the velvety appearance is caused by numerous round projections composed of bundles of the finest vascular loops, the termination of nerves, and a fine cellular tissue, but *no lymphatics*."*

The *retro-tarsal fold*, or cul-de-sac, is that portion which connects the palpebral to the ocular conjunctiva. It is richly endowed with

*The Anatomy and Histology of the Human Eye, p. 166. 1868.

papillæ, and is united to the parts beneath by a loose cellular tissue. In the upper palpebral fold are about forty-two and in the lower from two to six acinus glands, which furnish a secretion very nearly identical with the tears.

The *sclerotic conjunctiva* possesses no papillæ, no acini, and is well supplied with lymphatics. Upon the semilunar fold is situated a thick mass composed of sebaceous glands, a free admixture of fat-cells, and numerous hair-follicles containing fine hairs. This mass rests upon a minute plate of cartilage, and is known as the *caruncula lachrymalis*.

The *corneal conjunctiva* is composed entirely of epithelium, which is disposed in three layers, "the first a hyaline lamella of fused cells; beneath this a layer of cylindrical nucleated cells placed upright and closely arranged. The layer in immediate contact with the anterior elastic lamina of the cornea consists of round cells with large nuclei." In this portion are numerous wandering cells, precisely identical with those found in the substantia propria corneæ.

In the limbus, which serves to unite the sclerotic and corneal portions of the conjunctiva, are very numerous lymphatics and tufts of terminal nerves ending in clavate corpuscles. These clavate corpuscles are found in every portion of the conjunctiva except the corneal.

The tension of the palpebral conjunctiva keeps it from falling into folds; the absence of fat and sebaceous glands prevents the formation of abscesses. In the ocular conjunctiva there are no papillæ, and consequently no papillary inflammation can exist.

Having noted the chief points of difference between the conjunctiva and ordinary mucous membrane, it may not be amiss to consider what influence is exerted by mucus, pus, and neoplasms as elements of conjunctival disease.

Mucus is composed of cells precisely similar in form and appearance to pus-cells and white blood-corpuscles. In the microscopic characters of mucus, pus, white blood-corpuscles, and young epithelial cells there is this single difference: the young epithelial cell contains a single nucleus, while all the others are polynucleated. The young epithelial cell is not generally possessed of the distinct globular form common to the others, though it is sometimes; and as the nuclei constitute an infallible difference, I have laid particular emphasis upon that point.

Suppose, from some unknown cause, the conjunctival mucous membrane takes on a hyperæmic condition, followed in a few hours by copious lachrymation, with augmented mucous secretion, which, losing in a short time its fibrinous character, becomes superabundant and runs out over the edges of the lids. This is *purulent conjunctivitis*; and this purulent matter is as certainly inoculable as the matter from a variolous pustule. The very essence of this chain of morbid phenomena consists of processes of rapid cell-proliferation. Young epithelial cells are rapidly produced out of the underlying connective tissue, and are as rapidly detached; being detached in great numbers, warmth causes multiplication of nuclei, and this is mucus. Warmth continued, the fibrinous element undergoes putrescent change; and thus the matter is no longer mucus, but *pus*. Now as to the precise manner that purulent matter behaves when deposited on a mucous surface, in order to procreate purulent inflammation, is not known, and never will be until the contagious properties of matter can be accurately determined, which it would seem is one of the many things that is past finding out.

If the number of nuclei in a cell determines its power of proliferation, then the pus-cell above all others is endowed with powers of the most marvelously rapid multiplication, without power to enter upon a higher course of development, because there is no intercellular substance, nothing to hold the cells together, no woof for a web; in short, possessing the power of multiplication only.

Suppose the minutest particle of the granular detritus of a pus-cell is wafted by the wind into the eye; is it not possible for this to set up an irritation in the cellular elements of the conjunctiva precisely analogous to that which the minute particle of variolous matter sets up when placed under the epidermis? with this difference, however, the one will be limited in its action to the membrane upon which it is deposited, while the other may pervade the whole surface of the body.

Clinical experience proves that purulent ophthalmia prevails endemically, in the same sense that intermittent fever, cerebro-spinal meningitis, and diphtheria are said to have prevailed endemically. In that masterly treatise on diseases of the eye by William McKenzie may be found perhaps the best account of the clinical history of catarrhal and purulent ophthalmiæ which has ever appeared in the

English language, certainly the best which has been written within half a century. He says "the disease (muco-purulent conjunctivitis) is both endemic and epidemic; that it may arise in any region of the earth; but that it is most commonly prevalent in Egypt, Persia, and India; and does not arise from any specific principle or virus imported from Egypt. In the first instance it is excited by atmospheric or general causes; afterward it is propagated by contagion." Wells, McNamara, Lawson, Dixon, Travers, Graefe, Stellwag, Desmarres, Wecker, Galezowski, and in fact every body are agreed that catarrhal, purulent, papillary, and trachomatous ophthalmiæ are all species of the same genus; each one is contagious during the presence of pus in the discharges. In general terms I assert, as the established doctrine of almost the entire profession, that this multifarious disease prevails in the malarious regions of the earth, and nowhere else, except it be propagated by contagion; and this can be done in the form of pus only.

The time required for the production of purulent ophthalmia by inoculation varies from six to sixty hours; and the matter taken from a trachomatous surface may produce either of the other forms; so that there is really but one disease present, which may differ in degree of severity only, so far as the mucous surface is concerned. According to the most extended and recent observation the muco-purulent disease ranks, in point of severity and consequently in clinical importance, as follows: first, the purulent; second, the trachomatous; third, the papillary; fourth, the catarrhal—the catarrhal form frequently becoming in a short time purulent, trachomatous, or papillary; and sometimes all these stages or conditions seem to be present at the same time. Now all these varieties are, strictly speaking, purulent as soon as the first stage of the complaint has passed; but it should be borne in mind that where the first stage is of very short duration and the purulent discharge becomes copious the affection is called *purulent ophthalmia*, the catarrhal form or stage being that which is attended with hypersecretion of mucus unmixed with pus, and muco-purulent when the discharge is composed of both mucus and pus.

It has been and is now taught that in cases attended with chemosis death and subsequent sloughing of the cornea results from the pressure of the swollen conjunctiva overlapping the corneal margin. The late Mr. John Walker, surgeon to the Manchester Eye Hospital,

says,* "Travers, McKenzie, Middlemore, Tyrrel, and others are of opinion that pressure by the distended chemotic conjunctiva, preventing the passage of blood to the cornea, gives rise to mortification and sloughing." He then proceeds to explain "the extreme improbability of such an occurrence as death of the cornea from conjunctival swelling;" and concludes by declaring that he has "seen chemosis in every grade of intensity without corneal sloughing, and on the other hand every grade of corneal sloughing without any preceding chemosis."

In an outbreak of catarrhal ophthalmia among the inmates of the Protestant Episcopal Orphan Asylum of this city, in September, 1872—cases continuing to occur every now and then since that time—there were numerous cases in which the chemosis was very great, no incisions were made, and in no case was there even the slightest implication of the cornea.

I have seen numbers of iron-molders and machinists who, having met with the misfortune to get melted metal spattered into their eyes, had the greatest conceivable amount of chemosis, which persisted in two cases, the notes of which I preserved, for from eight to twelve days without any corneal implication whatever. I have long since ceased to be apprehensive of any sort of trouble from the presence of chemosis merely. The nature of the development of all the purulent forms of ophthalmia furnishes an explanation of the corneal ulceration entirely independent of any conjunctival swelling. The very essence of the disease in all its forms and stages consists in the proliferation of the epithelial and connective tissue-cells; and where there is this rapid cell-growth in the cornea the demand very soon exhausts the supply. There being none of the gland-cells here which exist in all mucous membranes, the subjacent connective tissue engages in the process of retrograde metamorphosis into pus, almost precisely as in the formation of abscess. It is an undeniable fact that in cases of purulent ophthalmia, attended with corneal ulceration, no similar destructive processes occur in the conjunctiva. The conjunctiva, in fact, never gives way to the advances of purulent inflammation.

And now the great question arises, *how* may this fell disease, so little less powerful than the dread angel of death, be *arrested* in its mad career as it stalks right on to the speedy destruction of sight?

*Oculist's Vade-Mecum, second edition, p. 28. London, 1857.

I answer in the name of thousands of trustworthy witnesses: alum, nitrate of silver, various salts of zinc, mercury, copper, the mineral acids, and all other drugs that have the property of *coagulating albumen*! How very remarkable that with the great advances the last quarter of a century has witnessed in pathological study some one had not hit upon the key to the solution of this great therapeutical question! *Coagulation of the discharges with no matter what, only taking care to keep the coagulating process in operation for a few hours, carefully and frequently removing the coagulated matter, and controlling the pain with anodynes, will not fail to arrest the disease.* And if this plan of treatment be begun in the very early stage of the disease, there will never save in extremely debilitated subjects be any corneal implication. It is scarcely necessary to support the position just taken by any extended examination of witnesses; brief allusion to a few, however, may serve to lift the veil of prejudice which has obscured the vision of so many thousands. In order then that the real purpose, for the accomplishment of which I am about to introduce some very stubborn witnesses, may not be misunderstood, I now declare that the application of caustic substances in the treatment of the purulent inflammations of the conjunctiva is an outrageously unwarrantable practice! There are no *authorities* in medicine. The mere *ipse dixit* of the greatest physician the world has ever produced is worth nothing! In this age, when the minutest atom of all the human organisms has been exposed to ocular inspection with the aid of the microscope, when almost every link in the chain of morbid action in every part of the body has been made to ring out its secrets in audible tones, we find facts so numerous that by a little care in their arrangement no one need be at a loss to correctly interpret every phase of disease and the best means of its relief; and especially is this true with respect to the diseases of those organs which are accessible to ocular inspection.

It is just a little curious that Sir William Adams with "a weak solution of alum, very frequently and thoroughly applied to the whole of the affected membrane," scarcely lost an eye, while Drs. Veitch, Travers, Desmarres, Roberts, Ridgeway, and others, who used nitrate of silver so systematically as to win golden opinions from the illustrious McKenzie, all *lost above forty per cent* of the eyes they treated. The accomplished Sir Patrick McGregor, who placed the world under obligations to him forever for introducing to the profession the prac-

tice of paracentesis corneæ, to save those eyes endangered by deep corneal ulcers, finally abandoned the silver treatment altogether. Mueller preferred a collyrium of three drops of sulphuric acid to the ounce of water, and believed that he had discovered an infallible remedy.

McKenzie makes a most judicious hit in suggesting one grain of corrosive sublimate and six grains of muriate of ammonia to from eight to twelve ounces of water, to be used very frequently as a cleansing wash. If Dr. Veitch had had the good judgment to adopt this, or the solution of alum so warmly advocated by Adams, or even the cold-water treatment so successful in the hands of the renowned Walther, we would find none of those melancholy accounts of the thousands of pensioners whose eyes were lost at Chelsea and Kilmainham hospitals. Any one who will read the accounts given by McGregor, Veitch, and others of the prevalence of muco-purulent ophthalmia in Great Britain after the return of the army from Egypt in 1800 can not fail to recognize the influence the treatment had in determining the fatal results. In 1804, when nitrate of silver was little used, and then in weak solution only, there was less fatality than in 1806, when nitrate of silver was used in very strong solution. "In the Second Battalion of the Fifty-second Regiment, numbering about seven hundred men, there were six hundred and thirty-six cases, including relapses, from August, 1805, to August, 1806. Of these fifty were dismissed with the loss of both eyes and forty with that of one." How many were seriously impaired by leucomata and peripheral perforations we are not informed; but it is reasonable to conclude that not more than one in five of all the cases with corneal implication resulted fatally to vision. Then we reasonably conclude that not more than one in six escaped with sound corneæ. The returns of Chelsea and Kilmainham hospitals on the 1st of December, 1810, show that there were at that time two thousand three hundred and seventeen soldiers a burden upon the public in consequence of the loss of both eyes from Egyptian ophthalmia in those hospitals. Allowing the same proportion as that reported from the Fifty-second Regiment, there were also at the same time two thousand five hundred and forty-eight totally blind in one eye, making a grand total of four thousand eight hundred and sixty-five men disabled from active military service on account of blindness.

Dr. Antonio Savaresi, who had charge of the French military hospitals in Egypt, employed general antiphlogistic treatment, and used locally alum with anodyne lotions, frequently applied. His success was most wonderful. "*Out of one thousand cases only two persons lost both eyes.*" The general prostration from the active depletion practiced by Surgeon Savaresi, added to the Egyptian ophthalmia, right where the disease was endemic, destroyed the vision of *two persons only* out of a thousand cases—the local treatment consisting of *alum* and *anodynes*. Out of six hundred and thirty-six cases, including relapses—really about five hundred cases—in the Fifty-second Regiment, treated with *nitrate of silver*, *FIFTY persons lost both eyes*. And of all the cases treated at Chelsea and Kilmainham hospitals with nitrate of silver more than forty per cent lost their eyes. Walther, who used cold water alone, did not lose above six per cent out of several hundred cases.

The irrepressible desire on the part of some surgeons to arrest the disease at one stroke gradually led Drs. Ridgeway, Veitch, O'Halloran, and others to adopt the caustic treatment. The same cause has produced advocates of that fatal practice every now and then since that time; and whatever its advocates may claim for it, no one dare deny that in India, where the disease prevails with the greatest intensity, where the treatment consists entirely of vegetable astringent washes, there are exceedingly few blind persons to be seen.

In those severe cases of ophthalmia neonatorum, in which the disease assumes a sort of diphtheritic character, a saturated solution of common salt injected between the lids every half hour will sometimes arrest the disease almost as if by magic.

PAPILLARY CONJUNCTIVITIS AND TRACHOMA.

The papillary ophthalmia most frequently met with here is that which follows the mild forms of catarrh. In those cases the papillæ become engorged with blood, and remain so until sufficient inflammatory action occurs to produce hypertrophy, when the disease may be said to be chronic. Papillary conjunctivitis, so far as the enlarged papillæ are concerned, is developed in precisely the same manner as hemorrhoids. First, the veins becoming engorged, the papillæ, being made up mostly of veins, are consequently enlarged; presently the blood in these engorged veins begins to part with its serum; then

fibrin begins to be deposited, soon to be organized into callous tissue ; and this is hypertrophy of the papillæ.

Trachoma is a much more serious form of disease ; unlike papillary conjunctivitis, which is necessarily limited to the palpebræ, this generally begins in the retro-tarsal fold, rapidly extending to both the palpebral and ocular portions. It is now established that, instead of being an engorged state of the minute lymphatics, as taught by Krause, trachoma consists in the development of neoplasms out of the connective tissue-corpuscles.

This disease prevails extensively among the inmates of poor-houses, prisons, poorly-ventilated manufacturing establishments where great numbers of persons are crowded together, and those who inhabit the narrow lanes and overcrowded alleys in large cities. In Louisville there are certain localities where at certain seasons of the year nearly all the inhabitants are afflicted with trachoma at one time. On the first day of the present month (April) I prescribed for an entire family consisting of five members, all suffering with acute trachoma. There is, in my mind, no question about the correctness of Mr. Marston's conclusions in reference to the malarial origin of many cases of trachoma—all cases, in fact, that are not dependent upon some pre-existing form of disease.

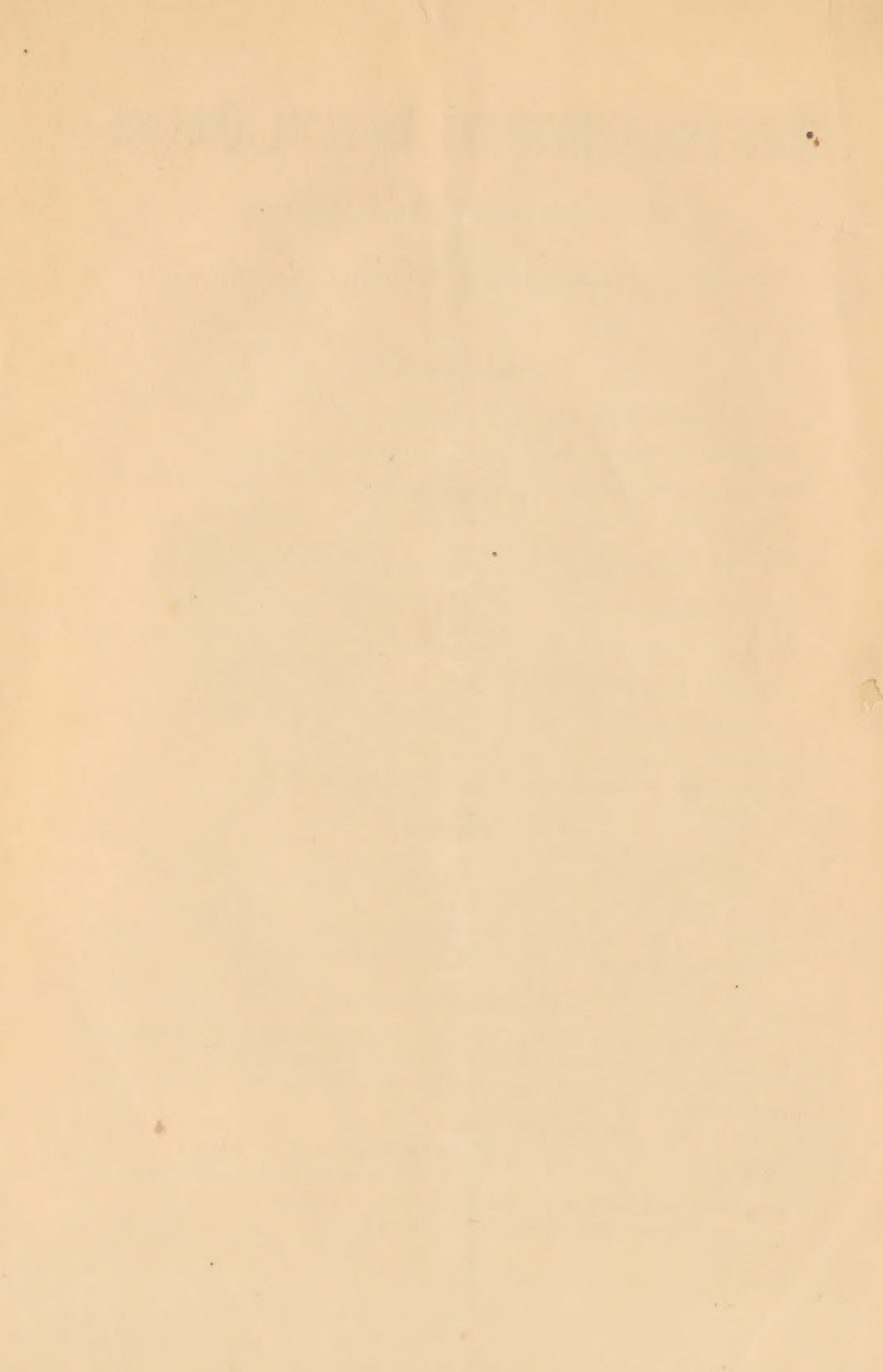
The tendency of both papillary and trachomatous ophthalmiæ is to become chronic, spontaneous cures being rarely known. In a paper published in the *American Practitioner* for June, 1872, I took occasion to recommend warm fomentations, weak solutions of carbolic acid, and muriate of ammonia in the treatment of acute trachoma. Accumulated experience has served to strengthen my confidence in that plan of treatment. The almost constant presence of constipation, with an intermittent type of fever, generally of mild form, like that which is commonly called dumb ague, furnishes a most palpable indication of the demand for constitutional medication in most all acute, subacute, and even many chronic cases. If there is any one form of disease that may be successfully treated by a routine practice, it is acute trachoma as it prevails in Louisville. I have almost a constant habit of prescribing a purgative dose of calomel ; quinine in full doses, to the production of quininism ; muriate of ammonia, one drachm to the quart of warm water, as a wash three times a day ; and a collyrium of three to five grains of carbolic acid to the ounce of water, to be

instilled into the eyes three to six times a day. Where this treatment is begun in the early stages of the disease little change will be found necessary in a vast majority of cases. If there be already some corneal abrasions from friction, canthoplasty should constitute the first step in the treatment. This operation is followed by the most prompt relief of all the distressing symptoms; and if the sutures be removed within twenty-four hours after their introduction, there will be no trace of the operation visible after a few weeks. Canthoplasty is to be reckoned among the greatest triumphs of modern surgery; certainly no other operation is more uniformly successful, and I know of none capable of conferring greater relief. It does what nothing else ever did; it almost infallibly cures chronic trachoma by arresting and preventing the possibility of a return of the blepharospasm which is ever present in these cases. During the year just past (1873) I did the canthoplastic operation *one hundred and eight times*, and it never disappointed me once.

The local treatment of papillary conjunctivitis must be regulated almost exclusively by the state of the vascular supply in the affected membrane—the crayon of sulphate of copper, with cold compresses, to-day; to-morrow, tannin or alum; next day, and it may be for a week to come, a collyrium of one to three grains of the chloride of zinc to the ounce of water, alternated with camphor-water lotion three times a day. Bad cases, associated with blepharospasm, require canthoplasty. In uncomplicated cases, where the papillæ are very large and succulent, I have found powdered tannin rubbed well into the chinks between the hypertrophied papillæ, and the lids carefully closed with a compressive bandage, and kept so for three or four hours after each application, to constitute a most rapidly successful plan of treatment. Another class of cases, attended with indurated palpebræ, may be successfully treated by applying a half-drachm solution of sulphate of copper or muriate of ammonia in substance to the everted lid, followed in six or eight hours by the tannin and compress. In still another class, where the papillæ are pale and flabby, by substituting a mixture of equal parts of alum and white sugar or calomel and white sugar for the tannin, most excellent results may be obtained. Without the aid of the compressive bandage to retain for a few hours the powder in contact with the diseased membrane, success will be the exception. After the removal of the bandage, if the eyes are found to

be oversensitive to light, or affected with an uncomfortable sense of dryness or heat, a lotion composed of half a drachm of borax to the pint of camphor-water, freely applied, will impart an almost immediate sense of relief.

In debilitated subjects no treatment will succeed without a general course of tonics, including outdoor exercise. The particular course of constitutional treatment to be pursued in each individual case is that which will readily suggest itself to the mind of any intelligent practitioner.



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